CALIFORNIA DIVISION OF MINES AND GEOLOGY

Fault Evaluation Report FER-21

February 22, 1977

1. Name of fault: Padre Juan fault.

2. Location of fault: Pitas Point 7.5 minute quadrangle (see plate 1).

3. Reason for evaluation: Part of a 10-year program; zoned in the Ventura County Safety and Seismic element (Nichols, 1974).

4. List of references:

a) Buchanan, J.M., Ziony, J.I., and Castle, R.O., 1973, Recent elevation changes across part of the Transverse Ranges near Ventura, California: Geological Society of America, Abstracts with Programs, v. 5, no. 1, p. 17.

b) Buchanan-Banks, J.M., Castle, R.O., and Ziony, J.I., 1975, Elevation changes in the Central Transverse Ranges near Ventura, California: Tectonophysics, v. 29, p. 113-125.

c) Jennings, C.W., 1975, Fault map of California with locations of volcanoes, thermal springs, and thermal wells: California Division of Mines and Geology, California Geologic Data Map Series, Map no. 1, scale 1:750,000.

d) Nichols, D.R., 1974, Surface faulting in Seismic and Safety Elements of the Resource's Plan and Program, Ventura County Planning Department, section II, p. 1-35, plate 1.

e) Smith, T.C., 1977, Red Mountain fault: California Division of Mines and Geology, unpublished Fault Evaluation Report, FER-21.

f) Vedder, J.G., Beyer, L.A., Junger, A., Moore, G.W., Roberts, A.E., Taylor, J.C., and Wagner, H.C., 1974, Preliminary report on the geology of the continental borderland of southern California: U.S. Geological Survey Miscellaneous Field Studies Map MF-624, 34 p., 9 plates, geologic map scale 1:500,000.

g) Weber, H.F., Jr., Cleveland, G.B., Kahle, J.E., Kiessling, E.F., Miller, R.V., Mills, M.F., Morton, D.M., and Cilweck, B.A., 1973, Geology and mineral resources study of southern Ventura County, California: California Division of Mines and Geology, Preliminary Report 14, 102 p., map scale 1:48,000.

h) Weber, F.H., Jr., Kiessling, E.W., Sprotte, E.C., Johnson, J.A., Sherburne, R.W., and Cleveland, G.B., 1975, Seismic hazards study of Ventura County, California: California Division of Mines and Geology, Open File Report 76-5 LA, 396 p., 9 plates.

i) Ziony, J.I., Wentworth, C.M., Buchanan-Banks, J.M., and Wagner, H.C., 1974, Preliminary map of recency of faulting in coastal southern California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-585, 15 p., map scale 1:250,000.

5. Summary of available data: The Padre Juan fault is a south-dipping, reverse fault (Buchanan, et al., 1973). Nichols (1974), zoned the Padre Juan fault as a part of the Red Mountain fault system.

Weber, et al. (1975, plate 5A) depicts the Padre Juan as cutting Pøco Formation (Pliocene) and as buried under terrace deposits (see plate 2). Weber, et al. (1975, p. 174) also include the Padre Juan fault as a part of the Red Mountain fault zone and state that faults within the zone probably have moved during the late Quaternary.

Although the Padre Juan fault is in close proximity to the Red Mountain thrust, these faults appear to be separate structures. The Red Mountain fault dips to the north and the sense of movement is northern block up, just the opposite of the Padre Juan (Smith, 1977). Also, the Red Mountain fault has been active as recently as the late Pleistocene, and perhaps even the Holocene. Although both faults may be the manifestation of regional compression, there is no compelling evidence that the Padre Juan is a branch of the Red Mountain fault. Indeed, the Red Mountain fault must truncate the Padre Juan fault.

Jennings (1975) depicts the Padre Juan fault as Quaternary in age. Vedder, et al. (1974, plate 3) show the fault as "pre-late Pleistocene." Ziony, et al. (1974) depict the fault as cutting strata of late Pliocene age.

Buchanan-Banks, et al (1975) report that precise leveling surveys show a differential change in elevation across the Padre Juan fault, the south side being relatively up approximately 85 mm. over a 32 year period. However, the whole area has been uplifted and subsidence over the Rincon oil field has reportedly resulted from the withdrawal of fluids. Thus, the differential change in elevation has been attributed, by Buchanan-Banks, et al., to subsidence rather than displacement along the Padre Juan fault. They also note that "although this contemporary movement is certainly consistent with recognized Quaternary activity along this fault, no geologic indications of Holocene movement have been found along the Padre Juan (underlining added for emphasis); hence, evidence of post-Pleistocene activity on the Padre Juan fault is uniquely defined by the geodetic data." An independent check of the monument locations (encircled in green, plate 2), and their graph, show that the differential elevation change takes place to the south of the fault, and does not precisely coincide with the fault.

6. Interpretation of air photos: Fairchild aerial photos from the Whittier College Collection were obtained and viewed stereoscopically. On photos numbers B15 through B17, flight C297B (flown in 1920, scale 1:24,000) it appears that old stream deposits (late Pleistocene(?)) are not affected by the fault. Additional observations are noted on plate 2.

7. Field observations: In light of the data presented in itmms 5 and 6, and the limited time available, detailed field observations were felt to be unnecessary.

8. Conclusions: The Padre Juan fault has probably had movement along it during the early Quaternary; however, there is no conclusive evidence of post-Pleistocene movement along the fault. Indeed, old stream deposits appear to be unaffected by the fault. There is (soft) evidence (leveling surveys) of historic accumulation of strain. Some or all of this strain may be due to fluid (oil, gas, water) withdrawal. In any case, most of the indicated elevation change may have occurred south of the fault trace.

9. Recommendations: Based on the evidence summarized in this report, the Padre Juan fault should not be zoned at this time.

10. Investigating geologist's name; date:

Theodore C. Smith
Assistant Geologist
February 22, 1977

I agree with recommendation.
3/8/77